

## WHAT IS CLAIMED IS:

1. An intumescent fire retardant system for use in polymeric moldings, comprising, on the basis of 100 parts by weight blended mixture of a polymer component comprising:
  - 20-45 parts of a polymeric binder comprising high density polyethylene having a density in the range of 0.940-0.970 g/cm<sup>3</sup> and an  $\alpha$ -olefin-containing copolymer having a density less than the density of the high density polyethylene;
  - 5-25 parts of a nitrogenous gas-generating agent selected from the group consisting of amines, ureas, guanidines, guanamines, s-triazines, amino acids, salts thereof, and mixtures thereof, wherein the salts are selected from the group consisting of phosphates, phosphonates, phosphinates, borates, cyanurates, sulfates and mixtures thereof;
  - 10-35 parts of a water vapor-generating agent;
  - 1-5 parts of an antioxidant; and
  - 0-15 parts of a reinforcing agent,wherein the system is essentially halogen-free.
2. The fire retardant system of claim 1 wherein the  $\alpha$ -olefin-containing copolymer is a copolymer of ethylene with one of butene, hexene and octene having a density in the range of 0.870-0.910 g/cm<sup>3</sup>.
3. The fire retardant system of claim 1 wherein the  $\alpha$ -olefin-containing copolymer is a linear low density ethylene octene copolymer having a density in the range of 0.870-0.910 g/cm<sup>3</sup>.

4. The fire retardant system of claim 1 wherein the system comprises 20-45 parts of the high density polyethylene and 0-15 parts of the  $\alpha$ -olefin-containing copolymer for a total of 20-45 parts polymeric binder.
5. The fire retardant system of claim 1 wherein nitrogenous gas-generating agent is an ammonium salt, a melamine salt, or a mixture thereof.
6. The fire retardant system of claim 1 wherein the nitrogenous gas-generating agent is selected from the group consisting of: melamine phosphates, melamine polyphosphates, melamine pyrophosphates, melamine cyanurates, ammonium phosphates, ammonium polyphosphates, ammonium pyrophosphates, ammonium cyanurates, and mixtures thereof.
7. The fire retardant system of claim 1 wherein the water vapor-generating agent is selected from the group consisting of: hydrated magnesia, hydrated alumina, intercalated graphite, and mixtures thereof.
8. The fire retardant system of claim 1 wherein the antioxidant is selected from the group consisting of: distearylthiodipropionate, a hindered phenol, and mixtures thereof.
9. The fire retardant system of claim 1 wherein the reinforcing agent is selected from the group consisting of: glass fibers, mica, titanium oxide and mixtures thereof.

10. An intumescent fire retardant polymeric moldable composition comprising, on the basis of 100 parts by weight blended mixture:

55-80 parts of a polymeric matrix; and

20-45 parts of the intumescent fire retardant system of claim 1.

11. The intumescent fire retardant polymeric composition of claim 10 wherein the polymeric matrix is a thermoplastic polymer selected from the group consisting of: polypropylene, nylon, polystyrene, a styrene-acrylonitrile copolymer, and a butadiene-styrene-acrylonitrile terpolymer.

12. The intumescent fire retardant polymeric composition of claim 10 wherein the polymeric matrix is a thermoset polymer selected from the group consisting of a polyurethane and an epoxy.

13. The intumescent fire retardant polymeric composition of claim 10 wherein the polymeric matrix is a thermoplastic polymer selected from the group consisting of: injection molding grade high density polyethylene, blow molding grade high density polyethylene, and extrusion molding grade high density polyethylene.

14. An intumescent fire retardant system for use in polymeric moldings, comprising, on the basis of 100 parts by weight blended mixture:

20-45 parts of a polymeric binder comprising high density polyethylene having a density in the range of 0.940-0.970 g/cm<sup>3</sup> and an  $\alpha$ -olefin-containing copolymer having a density in the range of 0.870-0.910 g/cm<sup>3</sup>, wherein  
5 20-45 parts of the blended mixture is the high density polyethylene and 0-15 parts of the blended mixture is the  $\alpha$ -olefin-containing copolymer;

15-25 parts of a nitrogenous gas-generating agent selected from the group consisting of an ammonium salt, a melamine salt, or mixtures thereof,  
10 wherein the salts are selected from the group consisting of phosphates, phosphonates, phosphinates, borates, cyanurates, sulfates and mixtures thereof;

20-30 parts of a water vapor-generating agent selected from the group consisting of hydrated magnesia, hydrated alumina, intercalated graphite, and mixtures thereof;

1-5 parts of an antioxidant selected from the group consisting of distearylthiodipropionate, a hindered phenol, and mixtures thereof; and

3-10 parts of a reinforcing agent selected from the group consisting of glass fibers, mica, titanium oxide and mixtures thereof,

wherein the system is essentially halogen-free.

15. The fire retardant system of claim 14 wherein the  $\alpha$ -olefin-containing copolymer is a copolymer of ethylene with one of butene, hexene and octene having a density in the range of 0.870-0.910 g/cm<sup>3</sup>.

16. The fire retardant system of claim 14 wherein the  $\alpha$ -olefin-containing copolymer is a linear low density ethylene octene copolymer having a density in the range of 0.870-0.910 g/cm<sup>3</sup>.

17. The intumescent fire retardant polymeric composition of claim 14 wherein the polymeric matrix is a thermoplastic polymer selected from the group consisting of: polypropylene, nylon, polystyrene, a styrene-acrylonitrile copolymer, and a butadiene-styrene-acrylonitrile terpolymer.

18. The intumescent fire retardant polymeric composition of claim 14 wherein the polymeric matrix is a thermoset polymer selected from the group consisting of a polyurethane and an epoxy.

19. The intumescent fire retardant polymeric composition of claim 14 wherein the polymeric matrix is a thermoplastic polymer selected from the group consisting of: injection molding grade high density polyethylene, blow molding grade high density polyethylene, and extrusion molding grade high density

5 polyethylene.

20. An intumescent fire retardant thermoplastic moldable composition comprising, on the basis of 100 parts by weight blended mixture:

55-80 parts of a thermoplastic matrix; and

20-45 parts of an intumescent fire retardant additive comprising on  
5 the basis of 100 parts by weight blended mixture:

20-45 parts of a polymeric binder comprising high density polyethylene having a density in the range of 0.940-0.970 g/cm<sup>3</sup> and an  $\alpha$ -olefin-containing copolymer having a density less than the density of the high density polyethylene;

10 5-25 parts of a nitrogenous gas-generating agent selected from the group consisting of amines, ureas, guanidines, guanamines, s-triazines, amino acids, salts thereof, and mixtures thereof, wherein the salts are selected from the group consisting of phosphates, phosphonates, phosphinates, borates, cyanurates, sulfates, and mixtures thereof;

15 10-35 parts of a water vapor-generating agent;

1-5 parts of an antioxidant; and

0-15 parts of a reinforcing agent,

wherein the thermoplastic polymer matrix and the intumescent fire retardant additive are each essentially halogen-free, and wherein the composition  
20 exhibits a peak heat release rate of less than 500 kW/m<sup>2</sup> as measured by the ASTM E1354 cone calorimeter method.